



Международная астрономическая олимпиада  
The International Astronomy Olympiad

С 1996 г.

Since 1996.

Сопроводительная инструкция

Supplement Instructions

## Rules and Regulations for a Jury member of the Olympiad and translators

There is an obligation of ANRAO authorities to translate these rules and regulations from English to native language of the teams. (Starting after the IAO-2004 this translation has to be done in written form as an obligatory part of application from an organization from a country to be national ANRAO or to continue to be national ANRAO.)

Initial originals of the instructions were in Russian in 1998, originals of the instructions are written in English since 2003, no Russian version since 2005.

There is an obligation of team leaders to translate these rules and regulations to native language. (Translation of the **green parts** has to be done in written form as an obligatory part of application to the IAO/APAO).

### General information and recommendations

- **One of the team leaders from every team has to take part in work of jury of theoretical round.** Only one: neither more jury members nor none of them are possible. Jury member from the team should be the same for all periods of work of Jury. This work can last a few days, as usual it is the second part of the Day of Theoretical round, the full next two days, part of the day before moderation, and final jury meeting in the late evening before the Day of Closing ceremony.
- It is necessary to inform organizers in advance who will be a jury member.
- Observers from non-participating states (not more than 1 observer from a country) may be included into jury for theoretical round.

### Requirements for jury member of theoretical round (i.e. requirements for one of team leaders)

- **Astronomy.** To be a specialist in astronomy or astronomy education, capable to solve problems of a level of the IAO and AP AO, understand students' solutions (including ones using unusual ways) and a little higher.
- **Languages.** Jury member has to know Latin and Greek alphabets, as well as English at a level sufficient to understand the solutions of students in English and to communicate with other members of the Jury about these solutions. Knowledge of Cyrillic and some 'key words' in Russian is recommended.
- **Translation of solutions.** Jury members should ask to translate solutions from languages unknown to them (to English, Russian or other understandable for both people language).  

Note (after IAO-2002): Some jury members did not ask to translate solutions from the unknown for them languages. Of course, sometimes translation from some languages not necessary since one may understand formulae and general way of solutions in such a languages as Portuguese, Swedish, Russian, Serbian, Italian, etc. Nevertheless, it is evident that nobody non-native may understand such a way in (for example) Armenian, Chinese or Korean languages. So there were a few episodes during the Olympiad when an initial mark of evaluation (when the jury member decided that translation is not necessary) was 0 or 1 but later (after request from a native language jury member to listen for translation) it was changed up to 4 or 5. It means that some jury members overestimate their own linguistic possibilities.
- To be familiar with the **"Rules and regulations for a participant of the Olympiad"**.

### Translation of problems before rounds

- **One of the team leaders from every team has to translate texts of the problems from Russian or English (written text on paper is provided by Organizing Committee) to native language of participants and prepare envelopes with the materials for every student of his team. Only one: neither more team leaders nor none of them are possible to make this procedure. Usually translation is done by the team leader – jury member, but it is obligatory only for Observational round, translations of the Theoretical and Practical rounds may be done by other team leader (but not observer). The translations must be made only by handwritten way using blue or violet (but not black) pen, and not by pencil. And it is a**

duty of jury member to have blue or violet operable pen(s). Any usage of black pen during the translation is forbidden.

Note: The rule of handwritten way does not concern translations done by the organisers to other languages, for example, translation to Chinese at IAO-2005.

- Observers from non-participating states may attend the translations.
- No discussion on the subject of the problems and on possibilities to include/exclude some information is possible during the translation. Nevertheless, misprints or grammar corrections, and corrections to avoid ambiguities in the original texts should be corrected.

Note (after IAO-2002): Versions (dialects) of English and Russian languages may be different. Translation from official texts in English or Russian may be done to own version of English or Russian.

- In the translation should be:
  - the **sequence** of the sentences – the same as in the original texts;
  - the **units** (for example, **g** or **Å**) – the same as in the original texts (not to convert into **kg** or **nm**);
  - the **emphasizing** (like underlining) of words or parts of text – the same as in the original texts;
  - **full** or **nothing** translation of the tables or supplement materials (e.g. it is forbidden to translate only word “Saturn” in the table when the names of other planets keep without translation);
  - kept words in Latin (like “ $\zeta$  Ursae Majoris”) as in the original texts.
- The volume of the translated text is:
  - for the theoretical and practical rounds – up to 2.5 pages of tight typed text;
  - for the observational round – up to 1 page of middle density typed text per every set.
- The time for translation is:
  - for the theoretical and practical rounds – 2 hours 15 minutes;
  - for the observational round – 45 minutes per every set.
- Translation is started before rounds beginning:
  - for the theoretical and practical rounds – at least 3 hours 15 minutes before;
  - for the observational round – as usual 1 hour 30 minutes before.
- Translation should be finished by translators (final text written on the headed form of the round) not later than
  - 60 minutes before the theoretical and practical rounds;
  - 45 minutes before the observational round;
 this time is necessary for technical jobs – copying of the texts, forming files for every participant, etc.
- If translation is not finished at this time, the translator must stop the work and prepare envelopes with the translated part of the texts and texts in official languages. For the theoretical and practical rounds translation may be continued later and the additional pages will be given to students during the round.
- It is **forbidden to have switched-on mobile telephones** and **mobile Internet** by translating team leaders (and observers) from the beginning of the translation till the round starting; any function of mobile phone cannot be used, calculator, for example.
- Any translator (and observer from nonparticipation country) may arrive to the room of translations later than official time, but it is **forbidden to go out of the room of translations** earlier than the round starts de facto.
- **Notebooks.** It is permitted to use own notebooks (**with internal power supply only**) as dictionaries. Connection to notebook of any external equipment except mouse is not permitted.
- It is an obligation of the translating team leader to form envelopes with all necessary texts and supplement materials for every participant of his or her team.

## Checking of students' solutions

- It is quite recommended **to solve problems yourself** to understand their level of difficulty and find other possible solutions.
- **Sketches for solutions.** Take into account that the sketch, as usual, shows one approach for solution. But it may be another or even a few ways of the solution of the problem. It is usual for the International Astronomy Olympiad that many problems have a few correct approaches to solution. It is one of the important difference of our Olympiad from many other International Science Olympiads.
- Every problem of theoretical round is to be checked and evaluated by **three jury members**: two of them check the solution through all papers of the students (of the group) and the third is the native jury member (team leader of the student). Verbal translation of solution for two first jury members may be

done by the third (native) one. There are only two checkings if the native jury member is simultaneously “through all of the students” jury member for this problem (score of this evaluation considered as “native”).

## Evaluation criteria

— **Evaluation mark.** 100% of points for solution of 1 problem is **8 points**. The whole correct solution to be evaluated as 8 pt, 50% of solution as 4 pt, 75% as 6 pt, etc. Some **additional 1 or 2 points** (upto 9 or 10) may be done for solution with some extra conclusions or corrected additions **concerning to the matter of the problem** after consultation (**agreement**) of the Theoretical Round Jury Chairperson (as usual he/she is vice-chairperson of jury responsible for theoretical round). As a maximum jury member may evaluate not more than 1 student’s solution as 10 pt and not more than 2 student’s solutions as 9 pt. A desire of a jury member to mark as 9 pt a larger number of solutions means that he/she underestimated level of 100% of solution. If a few solutions marked as 8 pt, the jury member may choose the best of them and mark it as 9 pt (without consultation with the Theoretical Round Jury Chairperson).

— **Evaluation mark** given for solution by a Jury member may have not more than 1 significant digit after the dot (that is possible, for example, 7, 7.1, 7.2, 7.5, but not 7.25). If the evaluation mark is integer, it should be written into the form cell without digits after the dot (that is **1, 7**, but not 1.0, 7.0).

— **Evaluation criteria.** In the evaluation of students’ solutions of theoretical problems, the most attention should be done for understanding nature (physics, astronomy) of the effects but not for calculations. Some **basic criteria** may be done together with the sketches for solutions. Otherwise the following gradation is recommended (roughly):

- Qualitative understanding of nature of effects of the problem – 1 pt.
- Necessary for solution formulae or (if formulae not necessary) necessary quantitative criteria of the nature of the effect – 2 pt.

(As usual it is not too easy to divide the above two criteria.)

- Algebraically (or logically) correct solving – 2 pt.
- Final calculations – 1-2 pt.
- Correct picture (if it is necessary due to requirements of the problem) – 1 pt.
- Final conclusion (if necessary) – 1 pt.

If solution is almost full, only arithmetical error has been done: total mark is 6-7 pt. Nevertheless, the “arithmetical error” should not lead to evidently incorrect answer. For example, an answer “mass of a star is 15 kg” or “stellar magnitude of an asteroid is  $-25^m$ ” is an error much more serious rather than arithmetical one, and such an answer is considered as “obviously absurd”. Such an error should be “penalised” by 3-4 pt (or dividing all the points by factor 2).

— A full correct solution with a correct answer has to be evaluated by full number of points regardless of the way of solution and regardless whether the student emphasized or not any transitional (intermediate) steps.

— A participant cannot be “barred” (or disqualified) because of his knowledge, i.e. for using facts (numerical values, formulae, transitional steps of solution etc.) known to him, which may be not evident for jury members (the mass of asteroid Vesta, for example) (if special conditions on the matter are not postulated in the actual problem’s situation, like “without using the value of speed of light...”).

— **Evaluation of qualitative problems.** In the evaluation of qualitative students’ explanation of ground for final answer is necessary. Brief answer such as “yes”, “no”, “doesn’t change” is not a solution. Make attention for quantitative criteria of effects is the solutions.

— **Rough copy.** A jury member has to see also the rough copy of solution if it is mentioned in student’s copybook “see rough copy” / “см. черновик”. Considerations that student gave into account in rough copy to be evaluated in such degree that they don’t contradict to final solution in clean copy. In particular if solutions in clean copy and in rough copy are different, then clean copy should be evaluated only.

## Preliminary native browsing of solutions

— As usual the native browsing of solutions is performed only with papers of Theoretical round. Nevertheless, sometimes it may be necessary to browse also some parts of papers of Practical and Observational rounds.

— At first every jury member browses their own students’ papers and write by red pen translation of the

main parts of solutions (either positive and negative features, notes like “galaxy size” or translations of the main terms may be also done). Full translating is not necessary on this stage.

Note (after IAO-2006): This procedure recommended in order making easier jobs of “through all the papers” checking and evaluating.

— Translations should be done at empty (odd) pages, while the text on the even pages in the national language should not be interfered.

— There should be no any marks at the pictures drawn by a student. The pictures should remain free of any marks of translator and also not be interfered.

— There should be no any words or marks in translation that may be considered as allusions to the correctness or incorrectness of solutions, such as “correct answer”, “error” or “+”, “-”.

— Solutions written in English in poor handwriting should be also “translated” by rewriting the text in good handwriting.

— Words with spelling mistakes (if the problem conditions require to write some Latin or English names, it means that roman script should be used, and spelling mistakes will be tolerated as far as the name of the object or phenomenon is understandable) should be also translated (like “Yupita” to “Jupiter”, etc.).

— During this native browsing Jury member should remove from envelopes all the papers that not concern the solutions. That is, only notebooks (answer sheets) and, if any, sheets with student’s work on the graphs, tables, photos, etc. should remain in the envelopes.

### **“Through all papers” checking and evaluating of solutions**

— After the previous procedure done, every member checks solutions of actual problem through all papers. As usual there are two problems for every jury member that he/she has to check and evaluate through all the papers. In this case one of the problems to be in group  $\alpha$  and other one – in group  $\beta$ . The situations of the same pairs of jury members for different problems checking should be avoided as well.

— Before the evaluating the member has to check solutions of a few students to prepare a table of grading that concretised the recommendations for evaluating mentioned in the previous chapter. Also, if necessary, the Jury member has to elaborate grading criteria for non-standard solutions. Points and its abbreviations should be written in English in this table. Do not hesitate to ask the Theoretical Round Jury Chairperson for recommendations, including situations with unusual solutions, and whether some solution is full or not. After that the jury member should fill the table-headers in the evaluating sheet of the problems and fill every column by figures. The last two columns as usual are: “equivalent correct parts of other ways of solution” and “extra conclusions or corrected additions”.

— Two jury members who check and evaluate the same problem (as different members) have to do it independently and not compare their marks.

Note: in the previous version of the rules this point existed in soft words – “jury members should do second and third checking without knowledge of other marks” – but many jury members did not follow it.

— Evaluation marks should be written to the special table (to be done by jury secretary) but not to the student’s paper.

### **Native evaluating of solutions**

— After two “through all of the students” checking done, evaluating sheets filled and given to the Theoretical Round Jury Chairperson (or jury secretary), jury members may work with their students’ papers and make “native evaluation”. Jury members must do their native evaluations without knowledge of other marks.

Note (after IAO-2005): This sequence is necessary to avoid political negotiations between jury members and “points markets”.

### **Recommendations**

— To have own sheet of paper for own notes about every solution and preliminary marks.

— Do not hesitate to ask the Theoretical Round Jury Chairperson for recommendations in unusual and non-standard solutions. As usual the Theoretical Round Jury Chairperson is composer of the set of problems so may easily understand whether some conclusion in student’s solution is correct or not.

### **Final mark for the solution, procedures of its calculation**

— If the native jury member is simultaneously “through all of the students” jury member for this problem, his/her mark is to be placed into the “native mark” column in minutes; the mark is also

considered as “native” in the case of two jury members are working in-group and one of them is native.

— After three marks done they are typed into computer by the jury secretaries. Solutions with large differences between three (or two) marks may be rechecked by the Theoretical Round Jury Chairperson and/or members of an independent commission around him/her (using the written criteria of the jury members) and his/her/their marks are to be used instead. As a part of this job it is an obligation of the Theoretical Jury Chairperson (or commission) to look through all the papers where the marks 7-8 exist to be sure that the correct solutions with the correct answers are evaluated by mark 8 finally. In other cases the final mark for the solution as usual (\*) calculated as average value of these three or two marks.

Note (after IAO-2005): An independent body of rechecking (the Theoretical Round Jury Chairperson who does not make regular checking and/or members of an independent commission around him/her) is necessary since in the previous system jury members were forced to be arbiters and advocates of their students simultaneously, there were stress situations.

— (\*) First exception from the previous point. There is a procedure for stimulation correct checking solutions of native students. For every jury member calculation of the mean difference between his/her “native marks” and “non-native marks” (ones of other jury members for the same solution) will be done. All “native marks” of about 20% jury members whose differences are the largest may not be taken into account.

Note: The procedure cannot work without the distinct sequence of operations: first, – “non-native evaluations” and only then – “native evaluations”.

Note: the Theoretical Round Jury Chairperson informs individually each of these 20% jury members about this exception for his/her “native marks”, and this information is hidden for others.

— (\*) Second exception from the previous point. There is a procedure for stimulation correct checking “through all of the students” solutions and correct behaviour of jury member. For every jury member calculation of the mean module difference between his/her “non-native marks” and other marks (ones of other jury members for the same solution) should be done. Problems with the largest difference may be rechecked by the Theoretical Round Jury Chairman, in the case of large difference the marks of the jury member to be cancelled and the marks of the Theoretical Round Jury Chairman to be used instead.

Note: the Theoretical Round Jury Chairperson informs individually jury members about the situation mentioned above. Situations with the “points market”, pressure between jury members, tendentious evaluating and other negative features are considered as also very negative. In the case of repeating at one of the next Olympiads, the person cannot be a jury member later, it means that he/she may be other (non-jury) team leader or observer at the next Olympiads and this information is to be presented to the corresponding ANRAO.

## **Main checking and evaluating of solutions of Practical and Observational rounds**

— This job will be done by LOC Jury members.

— As a rule, students are not allowed to write any text in any language in solutions of Practical and Observational rounds, and Jury should not take into account any text in any language in solution.

— Nevertheless, if any problem situation permits using any language, Jury have to check texts in all languages. In this case LOC Jury members should ask Native representatives to translate necessary part of solutions from languages unknown to them (to English, Russian or other understandable for both people language) in oral or written form.

— More instructions may be done additionally.

## **Native evaluating of solutions of Practical and Observational rounds**

— The Native check the solutions of the Practical and Observation rounds is mandatory for the teams participating in moderation. This is optional and can be skipped by those Jury members whose teams refuse to moderate.

— The Native jury members check and evaluate the solutions of the Practical and written part of the Observation rounds in accordance with the criteria provided by LOC Jury. These scores are not recorded in the table of minutes, but are used for comparison with the scores of LOC Jury members before and during the moderation.

## **Moderation of Practical and written part of Observational rounds**

— Moderation is a conversation between of the LOC Jury member who checked the problem and the Native Jury member.

— Moderation is optional for a team. Any team may refuse moderation.

— A team whose Native Jury member did not submit his or her scores to the Organizing Committee on time is not allowed to moderation.

- A priori, the score of LOC Jury member is recorded in the table of minutes, but it can be changed as a result of a conversation with the Native jury member during the moderation.
- More instructions will be done additionally.

### **Final Jury meeting. Voting**

- At the conclusion of all the rounds, and once all the results are available, the jury members will meet and look at the overall performance of all the students without knowing their names or nationality (the so called "blind minutes"). In frames of the conventional rules they will then decide on the cut off level for the I Diploma, II Diploma, III Diploma (corresponding to the Gold, Silver and Bronze Medal Certificates) and Diploma of Participation or ratify the levels for the I, II, III Diploma in the case they were calculated automatically by defined mathematical procedures.
- More instructions to be done before the meeting in oral or (if the proposed procedure is not simple) written form.
- The decision of the Jury Board is final. Nobody can change the decision: neither Local Organizing Committee nor Olympic Coordinating Council nor Chairman of the Olympiad.



IAO 1998 SAO, IAO 1999 Crimea, IAO 2000 SAO, IAO 2001 Crimea, IAO 2002 SAO, IAO 2003 Stockholm, IAO 2004 Crimea, IAO 2005 Beijing, APAO 2005 Irkutsk, IAO 2006 Bombay, APAO 2006 Vladivostok, IAO 2007 Crimea, APAO 2007 Xiamen, IAO 2008 Trieste, APAO 2008 Bishkek, APAO 2009 Damyang, IAO 2009 Hangzhou, IAO 2010 Crimea, APAO 2010 Papua, IAO 2011 Alma-Ata, APAO 2011 Aktobe, IAO 2012 Gwangju, APAO 2012 Cox's Bazar, IAO 2013 Vilnius, APAO 2013 Tomohon, IAO 2014 Bishkek, APAO 2014 Irkutsk, IAO 2015 Kazan, APAO 2015 Dhaka, IAO 2016 Pamporovo, APAO 2016 Goheung, IAO 2017 Weihai, APAO 2017 Novosibirsk, IAO 2018 Colombo, APAO 2018 Lijiang, IAO 2019 Piatra Neamt, APAO 2019 Tehran, IRAO 2021 Milan, IRAO 2022 Matera, IAO 2023 Beijing. OCC.